

What is claimed is:

1           1.     A method for simulation modeling where the simulation model  
2 includes individual blocks in a block diagram structure wherein each of the  
3 individual blocks include equation sets of a physical model, comprising the steps  
4 of:

5           configuring said blocks in a block diagram structure;

6           utilizing commercial simulation software to solve said equation sets of  
7 said blocks;

8           ordering said blocks in said block diagram structure to allow for

9                 waveform relaxation of sets of variables of said blocks; and

10          performing waveform relaxation of said sets of variables of said blocks.

1           2.     The method of claim 1, wherein said step of ordering said blocks in  
2 said block diagram structure includes decomposing said block diagram into  
3 subsystems.

1           3.     The method of claim 1, wherein said step of ordering said blocks in  
2 said block diagram structure includes identifying said sets of variables of said  
3 blocks.

1           4.     The method of claim 1, wherein said step of ordering said blocks in  
2 said block diagram structure includes adding a low fidelity model of one of said  
3 blocks.

1           5.     The method of claim 4, wherein said substep of adding said low  
2 fidelity model of one of said blocks includes deriving an error signal from an  
3 output of said one of said blocks and an output of said low fidelity model.

1           6.     The method of claim 5, wherein said step of ordering said blocks in  
2 said block diagram structure includes accelerating convergence of said  
3 simulation model by processing said error signal.

1           7.     The method of claim 1, wherein said step of performing waveform  
2 relaxation includes deriving a sparse interconnect matrix.

1           8.     The method of claim 7, wherein said step of performing waveform  
2 relaxation includes weakly-coupling said equation sets.

1           9.     The method of claim 8, wherein said step of utilizing said  
2 commercial simulation software includes running said commercial simulation  
3 software on a plurality of data processors.

1           10.    The method of claim 9, wherein said step of running said  
2 commercial software on said plurality of data processors includes waiting until  
3 each of said commercial simulation software has completed calculations before  
4 transmitting interprocessor communications data.

1           11.    The method of claim 1, wherein said equation sets change in  
2 subsequent iterations of said simulation model.



1           12.    The method of claim 11, wherein said equation sets increase in  
2 fidelity in subsequent iterations of said simulation model.

1           13.    The method of claim 1, wherein said step of performing waveform  
2 relaxation utilizes Gauss-Jacobi methods.

1           14.    The method of claim 1, wherein said step of performing waveform  
2 relaxation utilizes Gauss-Seidel methods.

1           15.    A computer readable medium having stored thereon instructions  
2 which when executed cause the computer to perform the steps of:  
3            configuring said blocks in a block diagram structure;  
4            utilizing commercial simulation software to solve said equation sets of  
5            said blocks;  
6            ordering said blocks in said block diagram structure to allow for  
7                waveform relaxation of sets of variables of said blocks; and  
8            performing waveform relaxation of said sets of variables of said blocks.

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